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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

RO, BENTSU

ART UNIT

PAPER NUMBER

2837

DATE MAILED: 07/31/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/028,681

Applicant(s)

TIEU, TRIET M.

Examiner

Bentsu Ro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18-20 is/are allowed.
- 6) ☒ Claim(s) 1-3,9-13,15 and 17 is/are rejected.
- 7) ☒ Claim(s) 4-8,14 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

FIRST OFFICE ACTION --- A NON-FINAL REJECTION

1. Applicant should amend claim 8 to depend on claim 10 because claim 10 defines a "spindle motor" and claim 8 refers the spindle motor. In the following rejection, the examiner assumes that claim 8 depends on claim 10.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 9, 12, 13 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by **Hashimoto US Patent No. 5,173,647**.

Regarding claim 1, Hashimoto teaches a method (and an apparatus) for controlling a motor (a voice coil motor, see Fig. 7, the voice coil motor 1a), comprising :
applying a first motor adjustment signal (Fig. 8 shows a speed detection circuit 2', the speed detection circuit 2' includes a differential circuit 21, the output signal at the differential circuit 21 is a first motor adjustment signal) within a first dynamic range of motor adjustment signals (Fig. 9A shows dynamic ranges of the motor adjustment signals based on the speed difference ΔV or d , see column 4, line 42; for example, the dynamic range of the differential gain G_v at the difference $d=256$ will be different from

the dynamic range of the differential gain G_v at difference $d=16$) to control a flow of current through the motor (the output of the speed detection circuit 2' is connected to a power amplifier 5 to control the current flow through the motor via a speed error detection circuit 3 as clearly shown in Fig. 7), the first motor adjustment signal determined in relation to a detected motor velocity error (Fig. 7 shows a motor speed error detection circuit 3 for determining the motor speed error signal ΔV or d);

when the first motor adjustment signal is proximate a selected one of an upper or a lower end of the first dynamic range, adjusting the first dynamic range to provide a different, second dynamic range of the motor adjustment signals (according to Fig. 9A, it is noted that the gain G_v is chosen from the upper range of the difference amount d , for example, when $d>256$, which corresponds to a first dynamic range, one gain is used; when $d=256$, the gain changed; the gain change after $d<256$ is a second dynamic range, and so on); and

subsequently applying a second motor adjustment signal within the second dynamic range to control application of current to the motor (again in Fig. 7, the motor current is adjusted at the power amplifier stage 5 based on the new speed error signal d or ΔV).

Regarding claim 2 and similar claim 13, the adjusting step comprises expanding the first dynamic range so that the second dynamic range is larger than the first dynamic range when the first motor adjustment signal is proximate the upper end of the

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first dynamic range (the expansion or contraction of the dynamic range depends on the type of n , for example, Fig. 9A shows an expanding differential gain G_v when the difference d increases; Fig. 9B shows a contracting current gain G_c when the difference d increases, further Figs. 9A and 9B both show expansion/contraction at or near the upper end of the dynamic range).

Regarding claim 9, Hashimoto's Fig. 8 shows DAC 25 and DAC 26, both provide signals having multibit digital values.

Claim 12 is basically same as that of the combination of claims 1 and 9, wherein the control logic could read onto Fig. 7, the gain table 6a and the selection circuitry could read onto the difference counter 6b.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 10, 15, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto.

Regarding claims 3 and 15, all digital signals are digitized somewhere between an upper (or maximum) and a lower (or minimum) reading of a curve to be digitized. Thus, the threshold is located somewhere between the upper reading and the lower reading. Take Hashimoto's Fig. 9 as an example, the switching of gain G_v is digitized between the first upper level and the zero level. The threshold (not shown) is somewhere between the first upper level and the second upper level.

Regarding claim 10, Hashimoto's servo positioning circuit can be used with any servo object 1, see Fig. 6A. This object obvious can be a spindle motor.

Regarding claim 17, adding a filter to smooth the first and the second motor adjustment signals is an obvious design choice.

It is well known in the art that a filter will smooth an electrical signal. Therefore, if an electrical signal is too noisy, it would have been obvious to a skilled person in the art to add a filter to remove the noise in the electrical signal.

6. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto as applied to claim 1 above, and further in view of Dinsdale US Patent No. 4,132,414.

Regarding claim 10, Hashimoto does not specifically illustrate a spindle motor as an embodiment, see the Fig. 6A circuit. However, the servo object can be a spindle motor which is well known in the art. The spindle motor can be turntable motor such as Dinsdale's turntable motor.

Regarding claim 11, Hashimoto does not teach hydrodynamic bearing to be used with a spindle motor. However, a hydrodynamic bearing used in a spindle motor is taught by Dinsdale. It would have been obvious to a skilled person in the art to use Hashimoto's servo circuit with Dinsdale's spindle motor having a hydrodynamic bearing.

Why?? A hydrodynamic bearing will form a film between the motor rotor and the motor stator, thus, the interference between the motor rotor and motor stator will be minimized. Other advantages are the minimization of bearing rumble, wow, flutter and vertical vibration.

Because using a hydrodynamic bearing has many advantages as mentioned above, it would have been obvious to a skilled person in the art to use a hydrodynamic bearing in the Hashimoto's servo object 1 (see Fig. 6A) to achieve the same subject matter as claimed.

7. Claims 18-20 are allowable. Claims 4-8, 14, 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bentsu Ro whose telephone number is (703) 308-3656. The examiner can normally be reached on Mon-Fri, 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on (703) 308-3370. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3431 for regular communications and (703) 305-3432 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0658.


Bentsu Ro
Senior Examiner
Art Unit 2837

July 21, 2003